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For the Belfast Monthly Magazine.

JULY 1807.

On the Presensation which Animals have of changes in the Weather. By Dr. F. A A. Mayer, at Gottingen. See Tillock's Philosophical Magazine, XI. 211.

FIRST then respecting the presensation which animals have of fair dry weather, clear. Dry weather generally follows after wet weather, when the atmosphere has been freed from the vapours collected in it by their falling to the earth in rain. Clouds as well as rain, and the means by which the air frees itself from the electric vapours that are continually arising, and if these again fall down, it appears very natural that animals, which live chiefly in the open air, should express, by various external movements the ease with which they breathe and perform all their vital functions. From this principle it seems not difficult to explain the following observations

The fluttering of batts in the evening, beetles flying about on the highways, and the sporting of gnats towards sun set, require no explanation. I shall only remark what is already known to every observer, that this presensation is highly useful to bats as well as to insects Every shower of rain would render it impossible for them to fly, as their wings are not secured by any oily matter against moisture; they would therefore be rendered much heavier by rain, and unfit for flying, and they could not be so easily placed again in folds, which considering the structure of these animals, is absolutely necessary, as when they have remained dry. The same principle seems to be applicable to the high flight of larks and swallows (1) which perhaps hasten to the upper regions of the atmosphere, because they are freer from vapours, and more suited to them, and because the lower regions being more loaded with vapours, afford them less pleasure than those above. The insects also which they pursuse for food take them perhaps a higher flight.

The croaking of the green frog in ponds, I cannot sufficiently explain; but it seems to express the pleasure arising from the greater quantity of insects then flying about, and which they can catch with more ease and convenience. But clear, dry weather is not so agreeable to frogs as the return of warm weather.(2) If they make a noise in the time of cold rain, warm dry weather will follow. But if the dry weather proceeds from raw winds, and if warmth and rain succeed, their noise may foretell rain; and therefore Linnæus' rule *prædicit pluvium* will lose nothing of its truth. He seems so much the more to be right, as more raw than warm days take place in the climate of Sweden. I have to my great inconvenience experienced the truth of his assertion on journeys which I was under the necessity of continuing for several days. That the weather fish* (Cobitis fossilis) leaves the water quite pure during dry weather, and the green frog† sits at the top of the glass, may proceed from the lighter or heavier state of the atmosphere, particularly as the latter is remarkably fond of cleanliness and moderately pure air.

The assembling of ravens in the fields, and the singing of wood pigeons, may be easily accounted for, from the above principles. I have never seen birds in good weather dress their feathers with oil from their fat glands, in order to secure them from rain; but I have observed many do so when the atmosphere was overcast, and when their was an appearance of rain. I should therefore include this circumstance in the following class, did not experience admit also of another explanation, viz. that the birds from the atmosphere becoming lighter, hope for the speedy arrival of dry weather, and therefore anoint themselves, and secure their feathers from moisture, that they may be able to fly higher than usual, with less impediment. If the last explanation ought not to be altogether rejected, as I do not think it can, we may admit of this observation; especially as all the experience of men worthy of belief, allows of no reasoning to be brought against it.(3)

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* So called, because kept in Germany to foretel changes of the weather; when the weather is fine they continue quiet, but before a storm or rain, they are very restless.

† This animal, though common in many parts of *Europe*, is *not found in England*.

The expression of animals which show a presensation of rainy weather, may be explained partly from the increasing weight of the atmosphere, partly from their manner of living, and partly from the want of moisture, which is necessary to their existence. The restlessness of domestic cattle may proceed from many causes. It is known that the atmosphere in summer before rain falls, is generally heavier, on account of the electric vapour that arises. The insects which infest cattle, and which mark this heaviness, become then more numerous, and getting into the stalls where cattle are kept, torment them, and make them restless. The ascending vapour has also some influence on the skins of these animals, which ceases when the earth does not suffer so much vapour to escape as before; or the air too strongly charged with electricity, excites in them an unpleasant sensation. It indeed appears strange to explain the same phœnomenon from two perfectly opposite causes, a want and an excess of electricity; but we know cases of the like kind in medicine, such for example, as that where the cramp and sleep produces atonia. People who have wounds or old ulcers feel, on a change of weather a contraction and burning in those parts; and why should not such affections take place in animals.(4)

All those grounds taken together will be sufficient, in my opinion, to explain why horses and asses rub themselves, shake their heads, and snuff the air by turning up their noses; why asses bray much, and jump about, why cattle scrape up the earth, and stamp with their feet; and why swine, though not hungry, eat greedily, and dig up the earth with their snouts. The restlessness, running about, scraping with their feet, and eating grass among dogs; and moles continually throwing up the earth, can all be deduced from the same; as well as cats dressing themselves.

I have remarked that cocks crow at every change of the weather, besides at the usual time. They as well as pigeons hasten to their places of shelter, in order to be secured against the rain, the approach of which they must be sensible of, by the continual weight of the atmosphere.(5)

The cause of fowls, pigeons, quails, and other birds, washing themselves, appears to me to be a certain heat or itching which they wish by these means to remove (6)

Swallows, in all probability, take a low flight on the approach of rainy weather, because the electric atmosphere is too heavy for them, and because they have not sufficient strength to mount above it. But cranes, as being stronger birds, employ all their strength to rise above it, and therefore fly so high (7)

I have remarked in ravens, that their croaking, unless when they smell carrion, proceeds from fear. They observe perhaps by the atmosphere still becoming heavier, that a storm highly disagreeable to them will soon take place, and therefore they croak, and attach themselves to trees; and when they are startled by any thing uncommon, they take a high flight making a loud cry. They easily discover their persecutors among men, and always cry with a loud noise as long as they think themselves pursued by them.(8)

That jack-daws, on the approach of rainy weather, flap their wings, and pick their feathers with their bills, may be explained partly by an unpleasant sensation before rain, and partly from the state of the atmosphere.(9)

To the before-mentioned itching or burning sensation, I refer the bathing and plunging of water-fowl. That the birds of the forest should hasten to their nests is very natural as from the state of the atmosphere they must apprehend rain.(10)

The crying of peacocks, except at pairing time, appears to be a phœnomenon analogous to the crowing of cocks, I have often remarked it on a change of weather, and often even on a change of wind (11)

That storks and cranes place their bills under their wings, is a phœnomenon also remarked among domestic fowls when they fly to their roosts to secure themselves against rain, Their pecking their breasts seems to signify an itching sensation in that part of their bodies (12)

The croaking of the male green or tree frog seems to denote an unpleasant sensation, for in fine weather I never heard them send forth the smallest cry. But the appearance of toads implies a pleasant sensation, as these animals are so fond of living in dirt.(13)

Ants labour with great diligence, and bees hasten home, and do not fly far from their hives, because they follow their instinct. The former endeavour to complete their habitations and secure themselves against rain, and perhaps to lay up provisions for the rainy season: the latter hasten home to their hives, and fly no more abroad, because the wet would impede them in their flight and labour.

Gnats (cenops) come into houses to secure themselves from rain, which would impede their flight, and there they attach themselves to the legs, to procure that nourishment which is denied them without.

The increased biting of fleas I cannot explain, as the natural history of these insects is as yet too obscure.

Earth worms creep from their holes through instinct, as they can move themselves forward only upon earth that is slippery (14)

A presensation of storms I have observed only among the perfect of the Mamalia, and as yet but among two, viz. man and the dog. Both these seem to have a sense of the increased electricity of the atmosphere. It appears in general, that the more imperfect animals remark only the approach of dry weather, the more perfect the approach of rain; and the most perfect the approach of storms. All animals, perhaps, with their external senses, and all plants by their organs, are sensible of the variations of the weather: but plants are not here my object, and it is not necessary to prove the influence of the weather on them, as it is sufficiently apparent to every observer. Here I allude only to the external expression of internal sensations, as may be seen by the adduced instances; else one might consider the shutting and expanding of many plants as foreboding variations of the weather.

The dog on the approach of rainy weather, expresses signs of uneasiness; scratches himself, because the fleas then bite him with more violence; digs up the earth with his feet, runs round, and eats grass: he is accustomed however to do the latter when he is very hot, perhaps to cool himself, and in general a storm follows soon after. Before a storm he evaporates more strongly, so that his smell becomes intolerable; he creeps in a dejected manner to his master, and lies quiet. The cat also seems to have this in common with the dog, that she creeps to her master also on the approach of a storm. But all these phœnomenon require a further explanation.

The most perfect of all animals, man is on the approach of storms only subject to unpleasant sensations; but these must teach him, in the most striking manner, that his spiritual part, even though it disengages itself so much from oppressive cares, is immediately connected here below with a sluggish body, which frequently exercises tyrannic sway over the soul. Men in a sound state of health are subjected on the approach of stormy weather, to a heaviness of body, and mind, a want of capacity to perform their usual occupations, a yawning and relaxation, which are highly disagreeable. These are often accompanied with a sensation of heat. All these phœnomenons appear in some more, and in others less, and in some do not take place at all, but the last case happens very rarely. Sick persons, or those whose juices are corrupted, experience besides the above, an itching in those parts of the body which are covered; and many who have old wounds, ulcers, and the like, have in these uncommon sensations. Many of these may be ascribed to perspiration checked by the great heat; though as Weikard, a philosophic physician asserts, the want of electric matter in the body may have some share in them also.

When stormy weather happens in winter, these sensations, as well as the before-mentioned presensation of animals, do not take place; at least no one has ever observed them. This in all probability, arises from the influence of the season.

I must conclude this essay with requesting, that what I have here said may be considered, as it really is, an hypothetic explanation of well known facts.

Some Observations on the foregoing Pages.

(1) The action of flying has a constant tendency to cause birds to ascend, therefore unless counteracted by the disposition to remain at a certain height, a long continuance of flight will make birds arrive at that height where their specific gravity and expanse are most equally ballanced, and they fly with the greatest ease. This is probably the reason that in fine weather when larks are not induced to descend by showers, that they ascend to great heights in the air.

(2) The frogs (rana temporaria) of the ditches of Ireland, never I believe croak but in the early spring, principally in the evenings, when warm and moist, or it might be said alone when the wind is southerly.

(3) As it is well known that the hygrometer indicates a considerable moisture being in the air before rain actually falls, may not birds feel this, and prepare their feathers accordingly in expectation of rain? Water-fowl may be set to wash and dress themselves at any time, by sprinkling a little water on them.

(4) It is a well known fact that when hot moist weather (or what is commonly called sultry) prevails, insects are then most active, consequently give cattle on which they feed most trouble. But I cannot deny altogether that cattle may feel some influence of this weather on their own bodies, as we know rheumatic pains are during the damp weather which precedes rain more acutely felt.

(5) Pea-fowl like geese are accustomed to cry on hearing any noise, and during a thunder storm the Peacock never ceases to cry.

(6) Most birds are troubled very much with Pediculi, and which either washing or tossing among their feathers eases them of in some degree. Buffon mentions that young pheasants soon become diseased and die when they have not an opportunity of cleaning themselves among sand.

(7) Swallows in all probability take their flight high or low according as the insects fly high or low. But cranes, and indeed all birds in their migratory excursions rise to a considerable height where they are less disturbed in all probability by eddy winds.

(8) The raven has a great variety of cries expressive of love, anger or fear; but as they remain paired, the most common is the call for its associate; when a raven sits upon the decaying branch of a tree (its most particular choice) uttering its hoarse monotonous notes, it is the call of love, not of fear. Anger or fear is expressed much seldomer, and in a much quicker and sharper tone.

(9) See Ob. 3.

(10) See Ob. 3 and 6.

(11) See Ob 5.

(12) It is the constant practice of birds to sleep with their heads under their wings, it keeps that extremity warm during the cold nights, requires less constant action of the muscles than when extended, and making their centre of gravity very different, enables them to sit on the perch with less exertion of their feet to hold fast.

(13) Toads make their appearance perhaps oftener in moist than in dry weather, for the same reason that snails and earth worms do, because the moisture of their skins is not so soon exhaled.

(14) See Ob. 13. T.

To the Editor of the Belfast Magazine.

"To bring *empiricism* of any description under the lash of ridicule is one way of establishing the credit of legitimate science—therefore he who laughs successfully at *quackery*, deserves the thanks of society.

Critical Review of "Corry's detector of Quackery.""

SIR,

A FEW years ago many persons, with good intentions and a perseverance that did them infinite honour, both by their writings and their conversation, endeavoured to obtain, from